

## **AIR COMPRESSOR HAVING STABLE CONFIGURATION**

The present invention is a continuous-in-part of U.S Patent Application No. 10/055,193, filed 25 January 2002, allowed.

### **BACKGROUND OF THE INVENTION**

#### 5 1. Field of the Invention

The present invention relates to an air compressor, and more particularly to an air compressor having a stable configuration for stably supporting rotatable members.

#### 2. Description of the Prior Art

10 Typical air compressors comprise a cylinder attached or secured to a base, and a motor secured to the base and coupled to the cylinder for actuating or driving the cylinder.

For example, U.S. Patent No. 4,551,074 to Asaka et al. discloses one of the typical air compressors which includes a motor  
15 coupled to a cylinder with a gearing mechanism. One of the gears is rotatably secured to a base with a gearing or the like. However, the gears include a symmetric structure such that the gears may be smoothly and rotatably secured to the base with or without the gearing.

20 The applicant has developed various kinds of typical air compressors, such as U.S. Patent No. 5,215,447 to Wen, U.S. Patent No. 6,095,758 to Chou, U.S. Patent No. 6,135,725 to Chou, and U.S. Patent No. 6,146,112 to Chou, each of which also comprises a motor coupled to a cylinder with an eccentric members.

25 The eccentric members will be rotated in a great speed by the motor, in order to drive the cylinders, such that the eccentric members are required to be smoothly secured or supported on the

base, and are required to be prevented from being swung or vibrated relative to the base. However, the typical air compressors do not have devices to smoothly and rotatably and eccentrically secure and support the eccentric members on the base.

5       The present invention has arisen to mitigate and/or obviate the afore-described disadvantages of the conventional air compressors.

### **SUMMARY OF THE INVENTION**

      The primary objective of the present invention is to provide an air compressor including a stable configuration for stably  
10   supporting eccentric and rotatable members on the base.

      In accordance with one aspect of the invention, there is provided an air compressor comprising a base including an opening formed therein and defined by a peripheral flange, a bearing engaged in the opening of the base, the peripheral flange of the base  
15   being engageable with the bearing to retain the bearing in the opening of the base, an eccentric member including a shaft extended therefrom, and rotatably engaged through the bearing, to rotatably secure the eccentric member to the base with the shaft, the eccentric member including a pin extended therefrom and eccentric relative to  
20   the shaft, a cylinder including a piston rod rotatably coupling to the pin of the eccentric member, a gear attached to the eccentric member, the gear and the eccentric member being rotated in concert with each other and being rotatable relative to the base about the shaft of the eccentric member, and a motor secured to the base and  
25   including a pinion provided thereon and engaged with the gear to rotate the gear and the eccentric member relative to the base, and to move the piston rod relative to the cylinder in a reciprocating action.

The gear and the eccentric member may be rotated in great speeds by the motor, and may be stably and smoothly secured to the base with the bearing.

5 The gear includes a chamber formed therein and defined by a peripheral casing, to receive the eccentric member in the peripheral casing of the gear. The gear includes at least one bar extended from the gear to define the peripheral casing of the gear.

Further objectives and advantages of the present invention will become apparent from a careful reading of the detailed description  
10 provided hereinbelow, with appropriate reference to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a partial exploded view of an air compressor in accordance with the present invention;

15 FIG. 2 is a partial exploded view of the air compressor;

FIG. 3 is a partial cross sectional view of the air compressor;

FIG. 4 is a partial perspective view illustrating the other arrangement of the air compressor; and

FIG. 5 is a partial exploded view illustrating a further  
20 arrangement of the air compressor.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to the drawings, and initially to FIGS. 1-3, an air compressor in accordance with the present invention comprises a housing or a cylinder 1 including one or more extensions 11  
25 extended therefrom, and a base 2 including one or more barrels 20 engaged into or onto and secured to the extensions 11 of the cylinder 1 respectively with fasteners 12.

Alternatively, as shown in FIGS. 4 and 5, the cylinder 1 may also be solidly secured to the base 2, and formed as a one-integral piece with the base 2. The base 2 may include an aperture 21 formed in the upper portion thereof, an orifice 22 formed in the lower  
5 portion thereof, and an opening 27 (FIG. 1) formed in the front portion thereof and communicating with the orifice 22 thereof.

For example, the base 2 may include a peripheral flange 28 to form or define the opening 27 thereof, and to form a peripheral shoulder 29 between the orifice 22 and the opening 27 thereof. A  
10 bearing 23 is engaged and secured in the opening 27 of the base 2, and solidly retained in the opening 27 of the base 2 with the peripheral flange 28 and the peripheral shoulder 29 of the base 2.

A motor 3 is secured to the upper portion of the base 2 with such as fasteners 13, and includes a spindle 31 extended through the  
15 aperture 21 of the base 2 (FIG. 3), and includes a pinion 32 secured to the spindle 31 thereof. A gear 33 is engaged with the pinion 32 and includes a chamber 34 and a bore 35 of different diameters formed therein and communicating with each other, and includes a peripheral casing 38 formed or defined by one or more bars 381 to  
20 form or define the chamber 34 thereof.

An eccentric member 36 is received and secured in the chamber 34 of the gear 33 and rotated in concert with the gear 33, and includes a shaft 37 engaged through the bore 35 of the gear 33 and engaged into and secured to the bearing 23 with such as a  
25 fastener 24, such that the shaft 37 and thus the eccentric member 36 and the gear 33 may be rotatably and smoothly secured to the base 2. The eccentric member 36 includes a crank or an eccentric pin 39

extended therefrom and coupled to a piston rod 19 of the cylinder 1, in order to move the piston rod relative to the cylinder in reciprocating actions.

In operation, as shown in FIG. 3, the gear 33 is engaged with  
5 and driven by the pinion 32 of the motor 3, such that the gear 33 and the eccentric member 36 are required to be smoothly and solidly secured to the base 2, in order to allow the gear 33 to be solidly driven by the pinion 32 of the motor 3.

In addition, the gear 33 and thus the eccentric member 36 will  
10 be rotated in a great speed by the motor 3, in order to drive the cylinder 1, such that it is important that the eccentric members 36 be smoothly secured or supported on the base 2, and be prevented from being swung or vibrated relative to the base 2.

The engagement of the bearing 23 between the shaft 37 of the  
15 eccentric members 36 and the base 2 may solidly secure the eccentric members 36 and the gear 33 to the base 2, to allow the eccentric members 36 and the gear 33 to be smoothly rotated relative to the base 2.

Accordingly, the air compressor includes a stable configuration  
20 for stably and smoothly supporting the eccentric members, that are rotated in great speeds, on the base.

Although this invention has been described with a certain degree of particularity, it is to be understood that the present disclosure has been made by way of example only and that  
25 numerous changes in the detailed construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.